A Submission of Micro Project Entitled

# "LATEST MOBILE TECHNOLOGIES USED"

By

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Diploma in
**COMPUTER ENGINEERING**

Under the Guidance of
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To

Department of Computer Engineering

**CSMSS College of Polytechnic, Aurangabad**

And

**Maharashtra State Board of Technical Education**

(MSBTE), Mumbai (M.S.)


# CERTIFICATE

This is to certify that Following Students of **Fourth semester** of Diploma in **Computer Engineering** of Institute **CSMSS College of Polytechnic (code:1152)** have completed the Micro Project satisfactorily in subject Data communication and computer network **(22414)** for the academic year 2022-2023 as prescribed in the curriculum.

**Place: Aurangabad**
**Date:**

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**PROJECT GUIDE** **HEAD OF DEPARTMENT**

**PRINCIPAL**

## ACKNOWLEDGEMENT

We would like to express our gratitude to the people who have helped us most throughout our project. We would like to express our sincere thanks to the principal of CSMSS College of Polytechnic **Dr. G. B. Dongre** for being always with us as a motivator. We are thankful to the H.O.D. **Ms. R. S. Pophale** of Computer Engineering Department for his kind support. We are grateful to our Project Guide **Mrs. M.V. Shisode** for nonstop support and continuous motivation for the project. Her help made us possible to complete our project with all accurate information. A special thanks goes to our friends who helped us in completing the project, where they all exchanged their own interesting ideas. We wish to thank our parents for their personal support and attention who inspired us to go our own way. Finally, we would like to thank God who made all things possible for us till the end.

| Sr. No | Name of Student | Sign |
|---|---|---|
| 1 | BODKHE SAMADHAN AJINATH | |
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# 1. MICRO - PROJECT PROPOSAL

**TITLE: Latest mobile technologies used**

## 1.0 AIMS /BENEFITS OF THE MICRO PROJECT –

Benefit Taken from this micro-project is that to understand different trends in mobile industry.

## 2.0 COURSE OUTCOMES ADDRESSED –

1. Analyze the functioning of data communication and computer network.
2. Select relevant transmission media and switching techniques as per need.
3. Analyse the transmission errors with respect to ieee standards.
4. Configure various networking devices.
5. Configure different tcp/ip services.

## 3.0 PROPOSED METHODOLOGY:

01. Basic information about computer data communication and network.
02. Basic information about mobile technologies.
03. Study latest trends in mobile industry.

## 4.0 ACTION PLANES:

| Sr. No | Details of Activities | Planned Start Date | Planned Finish Date | Name of Responsible Team Member |
|---|---|---|---|---|
| 1 | Study Basic of DCC | | | All |
| 2 | Study Different Mobile Operating Systems | | | All |
| 3 | Study Functions of Mobile Systems | | | All |
| 4 | Select Relevant Topic for Micro Project | | | All |
| 5 | Collect Information for Micro project | | | All |
| 6 | Make Project Report for Micro Project | | | All |

**5.0 RESOURCES REQUIRED:**

| Sr. No | Name of Resource / Material | Specifications | Quantity | Remarks |
|---|---|---|---|---|
| 1 | Computer | Ram minimum 2GB, i3-i5 preferable | 1 | |
| 2 | Operating System | Windows 7 / XP / LINUX | 1 | |
| 3 | Software | Turbo c | 1 | |
| 4 | Internet | Google | 1 | |
| 5 | Books | Computer graphics | 1 | |

❖ **NAMES OF TEAM MEMBER WITH ROLL NO:**

| **Sr. No** | **Name of Student** | **Roll No.** |
|---|---|---|
| **1** | BODKHE SAMADHAN AJINATH | 13 |
| **2** | JADHAV GAYATRI BHAUSAHEB | |

Approved by,

**Ms. M.V. SHISODE**

## 2. RATIONALE

Data communication is an essential concept in the creation of computer networks. Prior to the invention of networks, data had to be physically carried from one device to another. With digital networks, that task is not only easier, it is accomplished much more quickly. The ability has driven the entire computer industry, including software innovations and the creation of the Internet as a medium for use by both professionals and the public. As the industry grows, more people connect more devices to a network, resulting in a scope that increases exponentially.

Because of innovations in data communications technology:

- People can communicate and share information virtually instantaneously across the entire globe.
- Education and business concerns can take place no matter where the individual parties are located.

## 3. AIMS / BENEFITS OF THE MICRO PROJECT

- **This Micro – Project aims at**
  - To get knowledge of mobile technologies.
  - To use functions of different operating systems.
  - To study new trends in the smartphone world.

# 4. COURSE OUTCOMES ACHIEVED

1. Analyze the functioning of data communication and computer network.

2. Select relevant transmission media and switching techniques as per need.

3. Analyse the transmission errors with respect to ieee standards.

4. Configure various networking devices.

5. Configure different tcp/ip services.

# 5. LITERATURE REVIEW

Mobile technology is technology that goes where the user goes. It consists of portable two-way communications devices, computing devices and the networking technology that connects them.

Currently, mobile technology is typified by internet-enabled devices like smartphones, tablets and watches. These are the latest in a progression that includes two-way pagers, notebook computers, mobile telephones (flip phones), GPS-navigation devices and more.

The communications networks that connect these devices are loosely termed wireless technologies. They enable mobile devices to share voice, data and applications (mobile apps).

Mobile technology is pervasive and growing. The number of smartphone users has climbed beyond 3 billion[1] and the global mobile workforce is expected to reach 1.87 billion by 2022.

## Types of mobile networks

### Cellular networks

Radio networks using distributed cell towers that enable mobile devices (cell phones) to switch frequencies automatically and communicate without interruption across large geographic areas. The same basic switching capability enables cellular networks to accommodate many users across a limited number of radio frequencies.

### 4G networking

The current cellular service standard for most wireless communication. It uses packet switching technology, which organizes data into parts or packets for transmission and reassembles the information at the destination. 4G – "G" for generation — is reported to be 10x faster than 3G — and 5G, faster still, is coming. 5G uses a set of aggregated frequency bands to unlock bandwidth and is approximately 20x faster than 4G.

### WiFi

Radio waves that connect devices to the internet through localized routers called hotspots. Short for wireless fidelity, WiFi networks are like cell towers for internet access, but they don't automatically pass service without establishing a WiFi connection. Most mobile devices allow for automatic switching between Wi-Fi and cellular networks depending upon availability and user preference.

### Bluetooth

A telecommunications industry specification for connecting devices over short distances using short-wavelength radio waves. Bluetooth enables users to quickly connect or pair devices such as headsets, speakers, phones and other devices.

## 6 . ACTUAL RESOURCES USED

| Sr.No. | Name of Resource / Material | Specifications | Quantity | Remarks |
|---|---|---|---|---|
| 1 | Computer | RAM minimum 2GB, i3 -i5 preferable | 1 | |
| 2 | Operating System | Windows 7 | 1 | |
| 3 | Software | Turbo C | 1 | |
| 4 | Any other resource used | DCC book, Google chrome and teachers help . | 3 | |

# 7. ACTUAL METHODOLOGY FOLLOWED

Mobile development has become a priority and the new normal for many businesses. Without mobile-optimized solutions, companies undoubtedly risk losing a significant number of clients and lagging behind the competition. In this article, we've compiled the main mobile trends now and for the coming years.

The increased adoption of mobile devices has led to the remarkable growth of the mobile app industry.

- Currently, there are about **5.31 billion unique mobile users** worldwide, according to GSMA Intelligence.
- In 2021, users downloaded **230 billion applications** to their mobile devices, which is a 63% increase since 2016, according to Statista.
- The revenue of Android and iOS mobile applications reached **$133 billion** in 2021, according to BusinessofApps.

Smartphones, tablets and other mobile devices are opening up new business opportunities. Since customers need convenience and freedom, they expect to be able to access services via portable devices, and are willing to download applications to that end. However, not all applications appeal to all users. To satisfy customer needs and remain competitive in such conditions, mobile app developers must rely on innovative technologies.

The following list of the hottest mobile technology trends that will shape the industry in the near future can be useful both for those running a business and those who develop software solutions for mobile devices. Take a look at our list to learn something new and generate new ideas.

1. Artificial Intelligence (AI)
2. Augmented Reality and Virtual Reality
3. Mobile IoT Apps
4. Mobile Payments
5. Cloud-Based Mobile Applications
6. 5G Connectivity
7. Wearable Technology Impact on App Development
8. Enhanced Mobile Security
9. Mobile Devices for Home Automation
10. Mobile Apps for Small Businesses
11. Transportation Apps Strengthening
12. Mobile App Revenue on the Rise
13. Cross-Platform Mobile Development
14. Biometrics Technology Reshapes Mobile Apps
15. Location-Based Technology
16. Bring Your Own Device (BYOD)

### 1. Artificial Intelligence (AI)

Mobile industry trends have focused on artificial intelligence since 2017, when Apple allowed developers to integrate voice assistant Siri into their applications. This encouraged the adoption and integration of artificial intelligence and machine learning algorithms into applications in various fields.

The following are some popular use cases:

- Chatbots and virtual personal assistants in service industries
- Personalized ads and recommendations in eCommerce
- Motion and facial detection apps for surveillance systems
- Financial forecasting solutions
- Medical software that helps determine diagnoses and suggests treatment
- Voice recognition apps for gaming, entertainment, and hands-free communications

Currently, various mobile apps can recognize voice commands, analyze textual and visual data, anticipate user behavior, and make forecasts, recommendations and decisions. There is fierce competition between smartphone developers who want to package their devices with as many AI and ML elements as possible.

### 2. Augmented Reality and Virtual Reality

An increasing number of apps incorporate augmented reality (AR) and virtual reality (VR) features, and this trend is not going away.

According to ResearchAndMarkets, the mobile augmented reality market (MAR) was estimated at **$10.7 billion** in 2020. By 2027, it's forecast to grow to **$230.6 billion**.

Applications that use AR/VR provide incredible opportunities by enhancing the real-world environment with digital objects, thus improving user experience. A couple of years ago, AR and VR techniques were used mostly in gaming apps (remember the overwhelming success of Pokemon Go) and marketing campaigns to entertain and impress customers. Today, the mobile world leverages augmented and virtual reality for more practical purposes, such as:

- object measurement
- navigation
- education
- interior design
- user manuals.

A good example is CanvasLogic — a visual configuration software with 3D and AR features used to sell highly configurable products.

Furthermore, smartphone manufacturers have been increasing the production of AR-enabled devices: as a very conservative estimate, in 2021 there were **500+ million** iOS devices and **1+ billion** Android devices that could experience augmented reality.

### 3. Mobile IoT Apps

The Internet of Things has become mainstream in many sectors, from healthcare and agriculture to manufacturing and transportation, which has led to the increased development of IoT applications. In short, IoT apps bridge the gap between connected mobile devices and people.

Applications are the tools for remote management of connected devices, allowing users to:

- monitor readings of mobile devices and sensors
- analyze data, build charts and generate reports
- manage devices (configure, open/close, turn on/off, trigger notifications, and more).

IoT apps are equally beneficial for customer-focused solutions (smart home appliances, wearables, traffic sensors) and enterprise-grade management (oil and gas networks, railway lines, autonomous cars).

### 4. Mobile Payments

Currently, eCommerce is one of the most rapidly developing markets in the world, and mobile shopping is among the top trends. Consequently, the demand for mobile payments is growing.

According to BusinessofApps, there was a significant surge in the number of mobile payment app users in 2020 — **2.3 billion** against **1.4 billion** in 2019. This was primarily caused by the pandemic and people's avoidance of cash payment.

In addition to numerous banking applications, the most widely used payment apps include Apple Pay, Google Pay, PayPal, AliPay, WeChatPay and Zelle. These apps empower users to perform financial transactions faster, easier and from anywhere, contributing to the boom in mobile commerce. In 2022, the trend of developing eCommerce apps for mobile payments will continue.

### 5. Cloud-Based Mobile Applications

Mobile apps that integrate advanced technologies such as artificial intelligence, machine learning, IoT, etc., require a lot of storage in a mobile device's internal memory. But a gigabyte-sized app is not a solution of choice for users.

Cloud computing easily solves this problem: remote servers provide the necessary storage space for the seamless functioning of an app that is quickly downloaded and doesn't affect the internal memory of your mobile device. The cloud means:

- secure functioning across multiple devices
- saving money on hosting
- much more computing power
- better storage and loading capacity
- increasing user retention
- streamlining operations.

That's why providers actively invest in cloud-driven apps, which has contributed to the creation of the cloud mobile era.

### 6. 5G Connectivity

5G is transforming the world of mobile app development. The implementation of advanced technologies such as IoT, AI, AR, and cloud computing into mobile devices is possible due to the enhancement of wireless connectivity. Currently, the fifth-generation network is expanding globally, serving increased communication needs for billions of devices.

It provides the four main benefits for mobile solutions:

- **Speed** — the 5G standard is up to **100x faster** than 4G.
- **Low latency** — ultra-reliable low latency communication (URLLC) that comes with 5G ensures real-time data processing.
- **Connectivity** — with 5G, it is possible to connect up to a million mobile devices, compared with a couple of thousands supported by 4G. This opens up new opportunity for the development of IoT apps.
- **Bandwidth** — 5G offers excellent connectivity when working with low, mid and high bands.

### 7. Wearable Technology Impact on App Development

The emergence of wearable devices and their expanding use cases open up new opportunities for businesses. Mobile app development for wearables is one of the most booming industries because applications ensure a tighter connection between brands and users. If a wearable device is paired with an app, customers are more willing to use it as they get a wider range of opportunities (e.g., the analysis of collected data and personalized recommendations).

Wearable apps differ from smartphone apps: their interfaces are concise considering small screen sizes, and they need to have low energy consumption.
Currently, apps for smartwatches and fitness trackers are the most widely used solutions. But in the near future, more apps will be designed for other mobile devices, such as smart glasses or healthcare gadgets

### 8. Enhanced Mobile Security

App security remains the hottest issue for providers and consumers. Since users are feeding and managing confidential information on their smartphones and other mobile devices, they need excellent security measures in place.

The mobile development priority for the near future is to pay extra attention to creating built-in security features in applications. Blockchain is obviously going to be the main technology that will be used to ensure data protection.

### 9. Mobile Devices for Home Automation

Mobile technology together with IoT devices allow users to ensure the comfort and security of their home. And the trend for smart homes is growing due to the advancements in the IoT industry.

- Statista says that the smart home market worldwide will be worth about **$53 million** in 2022.
- Experts predict that more than **half the homes** in the US will have adopted home automation solutions by 2023.

Hence, smart homes are a huge market niche for mobile technology. Using a single application, homeowners can even remotely adjust temperature, humidity, ventilation, control water and electricity consumption, monitor surveillance systems and more.

### 10. Mobile Apps for Small Businesses

Today, a mobile application is not a luxury only available to the market leaders, but rather a tool that most small businesses need to connect with customers or personnel in real time and even on the go. Using an app, any business can optimize its workflow, attract more clients and leverage analytical insights. As a result, companies benefit from improved user experience and increased sales.

This year, more small companies working in spheres such as tourism, entertainment, medicine, catering, beauty and fitness will choose to develop a mobile solution

### 11. Transportation Apps Strengthening

The logistics and transportation industry actively incorporates mobile apps, undergoing significant transformations under their impact. There are two broad categories of mobile solutions for transportation:

- **For consumers** — route optimization apps, car rental apps, public transport schedule monitoring, traffic tracking and parking information systems, etc.
- **For businesses** — fleet management solutions, utility monitoring systems (fuel theft prevention is especially essential), delivery schedule optimization solutions, etc.

This sector represents a huge potential for app development, so growth is guaranteed

### 12. Mobile App Revenue on the Rise

The revenue of mobile apps across segments increases year by year, and 2022 is not an exception. Statista forecasts it will surpass **$469 billion** this year, with games, social networking and entertainment being the leading industries. By 2025, the revenue is predicted to hit the mark of **$613 billion**.

### 13. Cross-Platform Mobile Development

Android and iOS solutions dominate the mobile apps market (altogether over 99%). Hence, for many businesses, it's more cost-efficient to create a cross-platform app that will be equally compatible with all required platforms. Why will the number of cross-platform solutions increase? Read the details about cross-platform mobile development in our article.

### 14. Biometrics Technology Reshapes Mobile Apps

Since the security of sensitive data in mobile devices remains the hottest issue, applications are equipped with more advanced technologies to ensure their protection. In this regard, biometrics are gaining popularity.

According to Statista, the global biometric technologies market has been gradually growing in the past years. In the coming years, they predict a rapid surge in revenue, from **$36.6 billion** in 2020, to **$68.6 billion** in 2025.

The most popular types of biometrics used in apps are:

- face recognition
- voice recognition
- fingerprint scanning
- iris recognition
- hand geometry recognition
- signature recognition.

These features are effective measures for trusted authentication and data protection.

### 15. Location-Based Technology

Applications are widely used in telematics for tracking the physical location of assets (vehicles, animals, people) and taking corresponding actions. This is done with the help of location-based services and geofencing. Some popular use cases of the technology include:

- taxi services
- marketing and advertising
- fleet management
- travel and hospitality.

Obviously, there are many more opportunities location-based technology and geofencing open up to businesses, and we are going to see more apps with these features in 2022 and beyond

### 16. Bring Your Own Device (BYOD)

The BYOD concept implies that employees can use their personal mobile devices at work, which previously was mostly forbidden. Now, more companies have or plan to introduce BYOD policies. This step has become possible due to the increased security of mobile solutions and advanced cloud technologies that can safely synchronize data flows.

# 8. OUTCOMES OF THE MICRO - PROJECT:

**Outcomes of mobile technology**

The outcomes of using mobile technology in business can lead to:

- higher efficiency and productivity of staff
- better quality and flexibility of service you offer your customers
- the ability to accept payments wirelessly
- increased ability to communicate in and out of the workplace
- greater access to modern apps and services
- improved networking capabilities

Mobile devices can link you directly into the office network while working off-site. For example, you could remotely:

- set up a new customer's account
- access existing customer records
- check prices and stock availability
- place an order online

## 9. SKILL DEVELOPED / LEARNING OUTCOMES OF MICRO - PROJECT:

1. Leadership
2. Creativity
3. Logic
4. Error Solving
5. Team Work
6. Communication
7. Active listening
8. Time management
9. Critical thinking

## 10. APPLICATIONS OF MICRO – PROJECT

1. Better communication
2. Increased collaboration with your team
3. Remote work
4. Reduced operational costs and saved time
5. Increased productivity
6. Real time data
7. Access the cloud
8. One Response